

# Identifying Characteristics of Air Pollutants Associated with Heart Disease Indicators



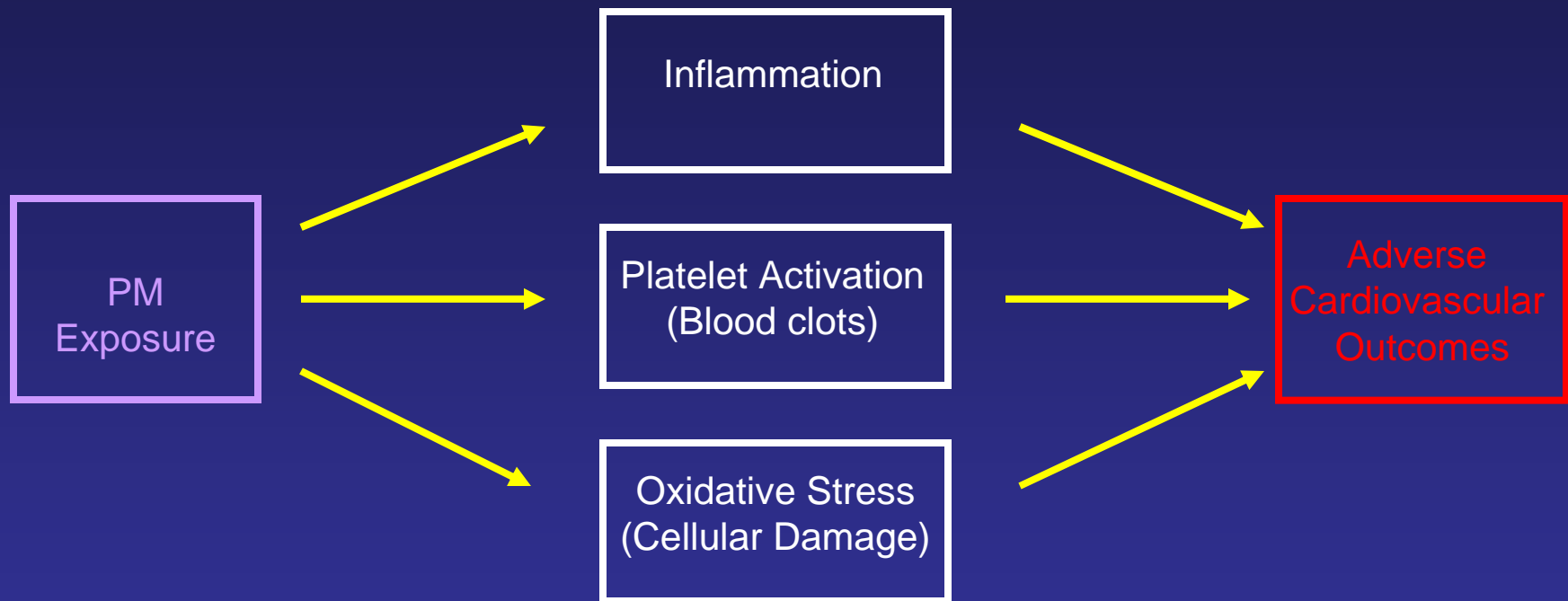
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Air Resources Board  
California Environmental Protection Agency

# PM and Cardiovascular Health

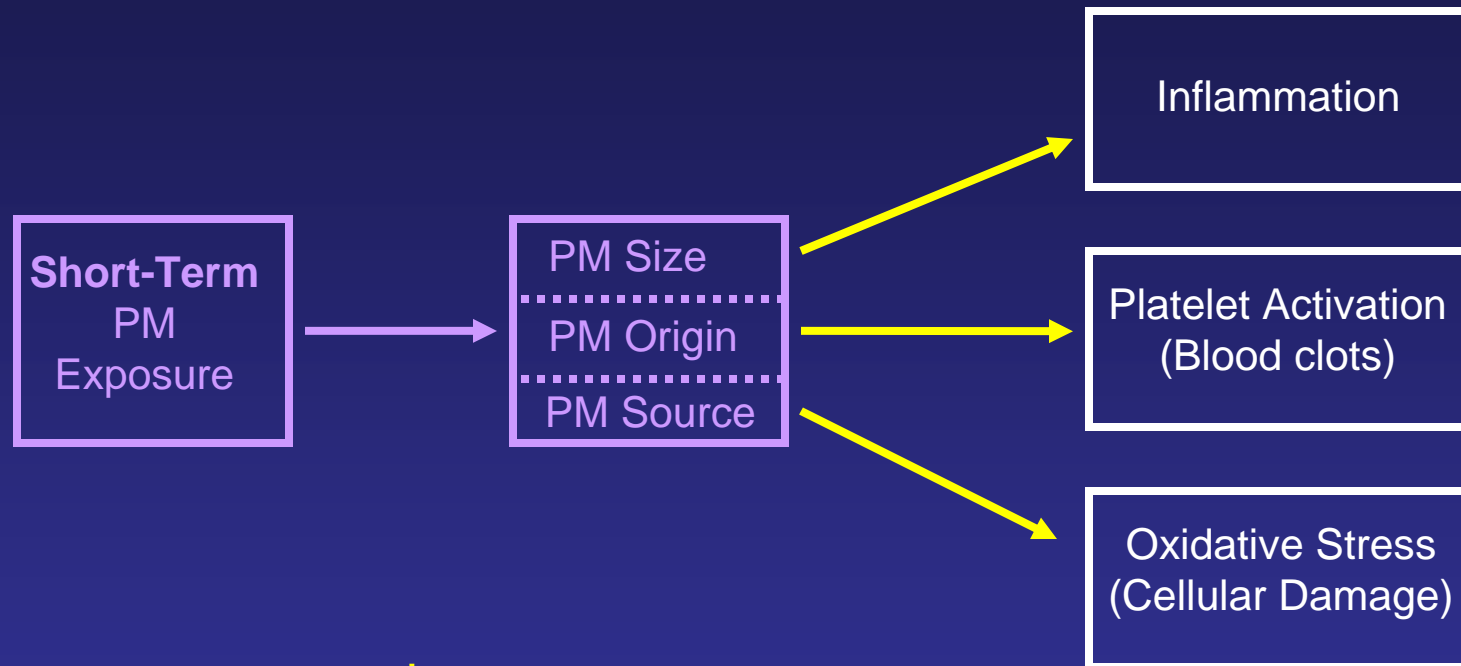
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Proposed Biological Mechanism

# Objective

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## Objective of Study \* :

Identify PM characteristics associated with changes in three classes of biomarkers of cellular injury

\*Delfino, R.J. Staimer, R. Tjoa, T. Polidori, A. Arhami, M. Gillen, D.L. Kleinman, M.R., Vazairi, N.D., Longhurst, Zaldivar, F. Sioutas, C. "Circulating Biomarkers of inflammation, Antioxidant Activity, and Platelet Activation Are Associated with Primary Combustion Aerosols in Subjects with Coronary Artery Disease". Environmental Health Perspectives 116:898-906 (2008) ARB Contract 03-329

# Methods

- 29 elderly adults in Southern California with coronary artery disease
- Blood analyzed for three classes of biomarkers
- PM characterization
  - PM mass for different size fractions
    - Quasi-ultrafine ( $\leq 0.25\mu\text{m}$ )
    - “Fine” ( $0.25\text{--}2.5\mu\text{m}$ )
    - Coarse ( $10\text{--}2.5\mu\text{m}$ )
  - Particle number
  - PM source: primary vs. secondary
  - PM origin: indoor vs. outdoor



# Results

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Changes in biomarker levels most consistently associated with:

- Ultrafine PM ( $\leq 0.25\mu\text{m}$ )
- Primary combustion PM (elemental and organic carbon)
- Particle number
- PM<sub>2.5</sub> components originating outdoors



# Conclusion

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- Traffic-related pollutants can lead to changes in biomarker levels
  - Ultrafine PM, primary organic and elemental carbon
- Exposure to these components of PM may lead to acute adverse health outcomes in elderly people with cardiovascular disease

